

Staff Technical Support Document for  
Chloride Total Maximum Daily Load Analysis  
Calleguas Creek Watershed

DRAFT January 3, 2002

APPENDIX A:  
DATA, ESTIMATES, AND ASSUMPTIONS  
FOR LINKAGE ANALYSIS

California Regional Water Quality Control Board  
Los Angeles Region  
320 West Fourth Street  
Los Angeles, California 90013

This Appendix describes methods and information used for analyses in this document, especially for the Linkage Analysis that relates observed in-stream ambient conditions to information about discharges and sources of chloride. The Appendix describes data relied upon about water quality and water quantity in the Calleguas Creek watershed; assumptions about discharges and sources, where data were not sufficiently detailed to completely characterize the human activities or the environmental systems; and methods used to make estimates using the data and the assumptions. The text of this Appendix is structured as a description of the detailed tables.

The tables and accompanying text describe available data from all sources available to the Regional Board, the sources of those data, and the interpretation of the data where that interpretation was not clear and straightforward. In some cases available data were not sufficiently complete to conduct all necessary analyses, for example about water quality and quantity at particular locations in the watershed. In those cases, Regional Board staff made estimates and assumptions. The estimates applied best professional methods, and were derived from a variety of sources including available data on similar environmental systems; information from stakeholders and others in the watershed; information from professional manuals of practice and guidelines from U.S. EPA; and best professional judgment of the Regional Board staff. The tables and text of Appendix A describe the basis for those estimates and assumptions, along with descriptions of available data and their limitations, so that readers of this Staff Report may readily identify the rationale behind the estimates and assumptions. That rationale may be used to improve estimates as additional information becomes available, or to calculate different estimates with different underlying assumptions should improved assumptions become available.

#### USE OF FLOW DATA TO DETERMINE MAXIMUM NON-STORM FLOW

Figure A-1 presents three pairs of graphs for historical in-stream flow (one for each of three locations in the waterbody), used in the analysis of flow data in Section 4 of the Technical Support Document to select the “maximum non-storm flow.” All graphs use data from the period determined to be representative of current conditions (called “recent period” in Section 4). The three locations are the points measured by USGS gauges in three parts of the waterbody: Arroyo Simi, at Madera Road; Conejo Creek at the Highway 101 overpass; and Calleguas Creek at Potrero Road. Each graph uses USGS data on mean daily discharge (mdd), quantified throughout this Report in units of cubic feet per second, but for this figure converted to liters per second for ease of use in the statistical program used for this analysis.

The goal of the analysis was to identify the flow amount, at each of the three locations, that describes the greatest flow observed under non-storm conditions, in order to separate those days dominated by storm flow (which is not impaired for chloride) from days with all other flow conditions. The graphs represent cumulative frequency distributions; that is, at each location, each measured mdd (located across the x axis) is plotted against the number of times it was observed during the period of record. The graphs use a normal probability plot on the y axis; that is, the scale is symmetrical about 50%, and logarithmic in each direction from the 50% point. The graph uses that normal probability plotting method in order to test the normality of the distribution. If the data follow a straight line in such a plot, the data are normally distributed,

which would allow use of certain statistical analyses that would be inappropriate if the data are not normally distributed. The straightness of the line is indicated by the correlation coefficient R marked on each graph: the more nearly R approaches 1.0, the more nearly the data are normally distributed.

Because it is routine for environmental data to follow a log-normal distribution, rather than a normal distribution, the first tests assumed these flow data to be log-normally distributed. For that reason, the frequency in the left-hand graph of each of the three pairs uses a natural-log transformation; that is, the x axis plots not the mdd in L/s, but the natural log of the mdd (labeled “ln of mdd, L/s”). Those graphs are in the column labeled “normality test for log-transform.”

The three left-hand graphs show a marked visual pattern. The data points to the right of the bend (above the dashed arrow) follow a reasonably straight line. In that neighborhood, the data are nearly log-normally distributed. However, to the left and below the bend or the dashed arrow, the data do not follow a straight line. The correlation coefficient R in those three graphs is not very near to 1.0, but instead is between 0.80 and 0.87, largely because of the significant curvature marked by the visible bend. The sharp change in slope at the bend of each graph indicates some statistical change in the data between the lower and the upper part.

The nature of that change is explained in the right-hand graphs, labeled “normality test for trimmed data.” All three graphs plot only those data points below the sharp curve in the left-hand graphs, and in all three cases use the mdd data directly, without the log-transform (x axes are labeled “mdd, L/s”). All three cases are very good approximations of a straight line, with correlation coefficients R of greater than 0.97 in the Conejo Creek data and greater than 0.99 in the data for the other two locations. The point of transition is especially clear in the Simi Valley data, where the dashed arrow corresponds to the bend in the curve. The transition is less clear in Conejo Creek, and even less so in Calleguas Creek, probably because both points are further downstream in the watershed and a greater number and variety of upstream discharges affect the in-stream flows. The transition point is chosen at about the 80<sup>th</sup> percentile for both points, a reasonable interpretation of the data, but other choices may be possible. The left-hand graph for Calleguas Creek illustrates the range of possible choices, with dashed arrows placed at both the 75<sup>th</sup> and 90<sup>th</sup> percentile points. The right-hand graph shows an extremely good fit for the 80<sup>th</sup> percentile at the Calleguas Creek location, so selecting the 80<sup>th</sup> percentile as the transition point is a reasonably conservative interpretation of the data. The Conejo Creek data do not achieve quite so complete a fit at the 80<sup>th</sup> percentile as do the other two locations, but Staff conclude the 80<sup>th</sup> percentile produces a reasonably good fit at R = 0.979.

Each location’s left-hand and right-hand graph, taken together, indicate a point where the flow data’s distribution shifts from normally distributed (to the left and below the sharp curve) to log-normally distributed (to the right and above the curve). The normally distributed data constitute 85% of all mdss in Arroyo Simi, and about 80% of all mdss in Conejo Creek and Calleguas Creek. All mdss measured above those points are log-normally distributed. It is reasonable to assume this clear shift in the data corresponds to the shift of in-stream flows from non-storm conditions to storm conditions. That is reasonable because during non-storm conditions, flow originates primarily from two sources, POTW discharges and groundwater discharges, plus a variety of smaller sources including groundwater pumped for treatment or

dewatering and miscellaneous urban runoff such as lawn watering and washing of buildings and vehicles. It is reasonable to expect those flows to be normally distributed. The flows during storm conditions may be expected to be log-normally distributed, following guidance from USEPA and others that suggests in-stream flows from natural discharges are log-normally distributed.

The point on the cumulative frequency graphs at which flow changes from normally distributed to log-normally distributed is assumed to be the point of maximum non-storm discharge. That is, the point marked by the dashed arrows is the greatest flow observed at those three locations before the data shift to a log-normal distribution, which is characteristic of storm flows. Those mean daily discharges correspond to about 140 L/s ( $5 \text{ ft}^3/\text{s}$ ) at the Arroyo Simi gauging station; about 650 L/s ( $\text{ft}^3/\text{s}$ ) at Conejo Creek; and about 910 L/s ( $32 \text{ ft}^3/\text{s}$ ) at Calleguas Creek gauging station. The flows calculated in this fashion for Arroyo Simi and Calleguas Creek are used throughout this document to describe maximum non-storm flow for those locations. The maximum non-storm flow used in the document for the Conejo Creek location has been adjusted downward slightly to  $20 \text{ ft}^3/\text{s}$ . That adjustment both compensates for the slight uncertainty in selecting the point of curvature, and improves the consistency of the flow assumption with other data and assumptions about discharges and withdrawals in that area of the waterbody.

## WATER QUALITY AND FLOW DATA FOR LINKAGE ANALYSIS

Table A-1 summarizes the available data and describe the assumptions and best professional judgment used to determine water quality (chloride concentration) in various reaches of the waterbody under various conditions. The water quality information was used in the linkage analysis, which was conducted using Table A-3 below. Table A-1 is divided into three sections. Table A-1A describes the northern portion of the watershed (Reaches 6, 7, and 8); Table A-1B describes the southern portion of the watershed (Reaches 9, 10, 11, 12, and 13); and Tables A-1C describes the parts of the Calleguas Creek main stem considered in this TMDL (Reach 3).

Table A-1 describes the best available data, which were used to determine water quality, along with assumptions about the data's representativity, statistical distribution, and consistency with other known data. Table A-1 lists the raw data and describes how the data were used to estimate water quality under typical conditions (i.e., routine days, or days characterized by typical non-storm flow—neither minimum flow nor maximum non-storm flow, but flow at approximately the 50<sup>th</sup> percentile of volume identified in the most recent flow data). In cases where data were incomplete or insufficiently detailed for precise calculations, Table A-1 describes the assumptions used by staff to estimate water quality. In cases where separate sources of information provided data that were inconsistent or did not support the same conclusions, Table A-1 describes the rationale used by staff to select between the conflicting data.

The data and water quality determinations in Table A-1 make use of estimates and assumptions to use available data in describing water quality under "typical" flow conditions. The assumed concentrations and flows used in the analysis were selected through a variety of approaches, not always the average of all available data. Averages were used in most cases for

chloride concentration data. For the flow rates in the stream channel and for most discharge types, instead of relying on averages either annually or seasonally, other statistical methods were applied as described in Section 4 and in the description of Figure A-1 above. That is because data available from USGS included enough points to make reasonable projections about changes under different conditions. An exception is POTW discharges, where average flow was used in most cases, adjusted for known or anticipated changes in response to drought conditions.

Those analyses use available data for all cases, and rely on those data to the extent possible. For many of the cases, data are limited, and assumptions are necessary. Table A-1 documents the assumptions used for this analysis, based largely on best professional judgment about the relative magnitudes of discharge volume from all dischargers under varying flow conditions, using mass balances analyses of flow volume. The best professional judgments are guided by mass balances by ensuring that the sum of all assumed discharges (and losses) in a given reach or set of reaches is equal to the flow volume measured, or modeled, in the stream at the three locations where flow conditions are defined by USGS gauges. Selection of the flow for each of the three conditions is guided by analysis of recent-period data, as discussed for Figure A-1 above and in Section 4 of the Technical Support Document.

Table A-2 summarizes the assumptions applied in using the water quality for “typical” conditions to determine water quality under other flow conditions of interest, the two critical conditions: maximum non-storm flow; and post-drought conditions. Section 7 of the Technical Support Document describes the choice of these two critical conditions, for use in selecting WLAs and LAs under routine conditions and drought conditions, respectively.

The assumptions described in Table A-2 are considered to be the best available estimates, because more detailed estimates cannot be supported with available data. That is the case even though concentration is known to vary considerably over time and under varying conditions, because the data about chloride concentration do not include sufficient data points to correlate changing concentration with changing conditions at each of the many discharge points and several in-stream measurement points. Ideally concentration data for the linkage analysis would include changes with factors such as season, annual and recent antecedent rainfall, land use and crop type changes, depth to water table, and a wide range of other factors; but in the absence of sufficient data to characterize those relationships, the linkage analysis assumes constant chloride concentration described by averaging available credible data.

## LINKAGE ANALYSIS

Table A-3 summarizes the calculations that form the linkage analysis under “standard” conditions, that is under conditions derived from best available information presented in Table A-1. Like the other tables in this Appendix, Table A-3 is divided into three sections: A-3A describes the northern portion of the watershed (Reaches 6, 7, and 8); A-3B describes the southern portion of the watershed (Reaches 9, 10, 11, 12, and 13); and A-3C describes the parts of the Calleguas Creek main stem considered in this TMDL, i.e. Reach 3. Data described in Table A-3 were used in Section 7 of the Technical Support Document to construct the graphs of Figures 8 and 9, which display chloride concentration at selected locations under each of the conditions of interest.

The linkage analysis served two purposes. First, the linkage analysis shown in Table A-3 demonstrates the model replicates observed water quality and flow under “typical” flow conditions, or average non-storm conditions. That is, the parameters described in Table A-1 above were consistent with actual observations; the model structure, assumptions, and input data for typical conditions are consistent best available information about water quality and flow conditions in the waterbody.

Second, the linkage analysis was used to predict water quality and flow conditions under other flow conditions of interest: low flow; maximum non-storm flow; average storm flow; drought conditions; and conditions during the immediate post-drought period. All the chloride concentration and flow data described in the table were calculated using assumptions presented in Tables A-1 and A-2, including based on best available data and on best professional judgment about how chloride loads and volumes of discharges are known or expected to change under changing flow conditions.

In these tables as well as elsewhere in the document, low flow is also referred to as “7Q10” flow, after the USGS method of observing the lowest average flow over any 7-day period within a dataset covering 10 years. The low flow was not determined in that fashion because the data record for flow was judged not to have sufficient period of record to reliably predict the 7Q10 flow under current conditions in the waterbody. Instead the low flow was calculated as the lowest flow consistent with assumptions about dischargers to the waterbody as described in the linkage analysis using the mass balance model.

## WLA AND LA SPECIFICATIONS

Tables A-4 and A-5 present the calculations of the linkage model used to specify WLAs and LAs for the TMDL for routine conditions and drought conditions, respectively. Table A-4 summarizes calculations for routine days based on critical conditions of maximum non-storm flow. Table A-5 summarizes calculations for drought periods, calculated based on critical conditions of post-drought periods. Like the other tables in this Appendix, Tables A-4 and A-5 are divided into three sections: A-4A and A-5A for the northern portion of the watershed; A-4B and A-5B for the southern portion of the watershed (Reaches 9, 10, 11, 12, and 13); and A-4C and A-5C for the Calleguas Creek main stem.

The two tables use the same model calculations as in Table A-3, with the addition of a set of conditions where chloride loadings to the waterbody are changed to reflect the specified WLAs and LAs. The two tables form the basis for information found in the tables of Section 8 of the Technical Support Document. Tables A-4 and A-5 include the specified WLAs and LAs, which may also be found in the TMDL Staff Report and in the Technical Support Document. In addition, Tables A-4 and A-5 also present the calculation of in-stream chloride concentration under the WLAs and LAs specified for the TMDL. Tables A-4 and A-5 therefore demonstrate that the specified WLAs and LAs are expected to achieve the specified numeric targets, a requirement of the TMDL.

The ambient conditions shown in Tables A-4 and A-5 (flow volume and chloride concentration) are calculated using input conditions of the concentration and flow specified by

the TMDL for each of the discharges in the watershed. The calculations incorporate effects in each reach of flow and concentration entering from upstream reaches, as well as effects of chloride loads entering the reaches. Under most conditions (excepting only storm flow conditions), Reach 3 receives flow only from the southern reaches, so the Reach 3 calculations are affected by loads from Reaches 9 through 13, and are unaffected by loads from Reaches 6, 7, and 8.

As stated in Section 8 of the Technical Support Document, the numeric targets for each reach were calculated incorporating an explicit margin of safety in the form of a safety factor applied to in-stream chloride concentration. The concentrations achieved in Tables A-4 and A-5 are 136 mg/L in Reaches 3, 9, 10, 11, 12, and 13 (rather than the specified WQO of 150 mg/L), and 100 mg/L in Reaches 6, 7, and 8 (rather than the specified WQO of 110 mg/L). In both cases, the WQO is equal to 110% of the projected concentrations; that is, the concentrations projected could be exceeded by as much as 10% while still achieving the specified WQO.

Tables A-4 and A-5 were used by staff to identify the WLAs and LAs that would achieve the specified numeric targets at all locations in the waterbody. That is, staff used the spreadsheets to enter proposed LAs and WLAs, and the resulting in-stream concentration was compared to the specified numeric targets to verify that the specified WLAs and LAs met the targets. In effect, the electronic versions of these spreadsheets consisted of the mass balance model, described in Section 7 of the Technical Support Document. The final tables, as reproduced here, demonstrate how the WQOs for each location will be attained under the discharge limits specified in this TMDL, under the assumptions made throughout this document and with the margin of safety specified in Section 8A.

**Table A-1A. Sources of Data for Linkage Analysis and Assumptions Used in Mass Balance Model for Critical Conditions, Part 1: Northern Reaches**

<u>Reach</u>	<u>Inflows and Outflows to Reach: Best Available Data</u>			<u>Assumption for Linkage Model</u>			
<u>Type of Inflow or Outflow</u>	<u>Flow, ft<sup>3</sup>/s*</u>	<u>Data Source for Flow</u>	<u>Conc., mg/L</u>	<u>Data Source for Concentration</u>	<u>Flow, ft<sup>3</sup>/s*</u>	<u>Conc., mg/L</u>	<u>Rationale for Assumption</u>
<b>Tapo Canyon, reach 8</b>							
Groundwater discharge and urban non-storm runoff	19	Total for Reaches 7+8+pumped (part) groundwater, average flow 1973-1983 = 19 cfs; Boyle Eng. 1987	152	Average concentration for 1973-83 of in-stream flow in Reaches 7+8, including pumped groundwater: Boyle Eng. 1987	2.0	150	Assumed apportionment among Reach 8, Reach 7 above gauge, and Reach 7 below gauge
Groundwater discharge	4.3	Average of reported flow under (part) low-flow (summer) conditions, 1993-94: Montgomery Watson, 1995; 4.3 cfs is total for Reach 8 and Reach 7 both above and below USGS gauge	152	Discharge from urban and suburban land uses observed (runoff from domestic irrigation, etc).	2.0	152	Discharge from urban and suburban land uses observed (runoff from domestic irrigation, etc).
Urban non-storm runoff							
<b>Arroyo Simi, reach 7--above USGS gauge</b>							
Groundwater discharge and urban non-storm runoff	19	as above (part)	152	as above	1.0	150	Average flow reported by Boyle Eng. not representative of critical conditions. Partition between runoff and groundwater discharge is assumed, as described below.
Groundwater discharge	4.3	as above (part)					Assumed apportionment among Reach 8 and Reach 7 consistent with flow under selected critical conditions at gauge. Zero urban runoff assumed in this part Reach 7.
<b>Control point: USGS gauge, Arroyo Simi Madera Road</b>	5	USGS data: non-storm conditions, 1979-1983. Inflow from reaches 9, 10, 11, 12, 13.	145	CCCS, 2000	5	151	CCCS average of 12 flow measurements does not represent critical conditions.
	45	CCCS, 2000					

\* Flow entering stream (inflow) is indicated by a positive number; outflow is indicated by a negative number  
(s) Stream conditions control this concentration: withdrawal water quality is dictated by ambient concentration at this point.

## Calleguas Creek Chloride TMDL

## Draft Staff Technical Support Document

January 3, 2002

**Table A-1A, continued. Sources of Data for Linkage Analysis and Assumptions Used in Mass Balance Model for Critical Conditions, Part 1: Northern Reaches**

Reach	Inflows and Outflows to Reach: Best Available Data				Assumption for Linkage Model
	Type of Inflow or Outflow	Flow, ft <sup>3</sup> /s*	Data Source for Flow	Conc., mg/L	
<b>Arroyo Simi, reach 7--below USGS gauge</b>					
Groundwater discharge and urban non-storm runoff	19 Total for Reaches 7+8+ pumped (part) groundwater, average flow 1973-1983 = 19 cfs. Boyle Eng. 1987	152	as above		Average flow reported by Boyle Eng. not representative of critical conditions. Partition between runoff and groundwater discharge is assumed, as described below.
Urban non-storm runoff					1.0 20 Not documented in Reach 7, but known to exist in adjacent Reach 9; volume and concentration assumed to be similar.
Groundwater discharge	4.3 Average of reported flow under (part) low-flow (summer) conditions, 1993-94. Montgomery Watson, 1995; 4.3 cfs is total for Reach 8 and Reach 7 both above and below USGS gauge	150	Montgomery Watson, 1995	3.0	Assumed apportionment among Reach 8 and Reach 7 consistent with flow under selected critical conditions at gauge.
Pumped groundwater	3 Montgomery Watson, 1995	150	Montgomery Watson, 1995	3.0	Dewatering for construction in area of shallow groundwater.
Simi Valley Water Quality Control Plant (POTW)	14 Average of 1999 NPDES reported discharges	113	Average of 1999 NPDES reported discharges	14	113
<b>Arroyo Simi, reach 7--below Highway 23</b>					
Ventura County (Moorpark) Wastewater Treatment Plant (POTW)	3.1 Average of 1998 NPDES reported discharges	118	Average of 1998 NPDES reported discharges	0	118 Effluent discharges to percolation ponds in an area of groundwater recharge.
Groundwater recharge				-12	(s) Total of groundwater recharge plus agricultural withdrawals adjusted to meet known condition of in-stream flow = 0 near Somis Road.
Agricultural				-4	(s) As above.
<b>Arroyo Las Posas, reach 6</b>					
Groundwater recharge	-14			-1	(s) As above.
Infow from Reach 7				-7	As above.
Agricultural				8.3	130 Calculated by the model using assumptions described in this table.

\* Flow entering stream (inflow) is indicated by a positive number; outflow is indicated by a negative number  
(s) Stream conditions control this concentration: withdrawal water quality is dictated by ambient concentration at this point

**Table A-1B. Sources of Data for Linkage Analysis and Assumptions Used in Mass Balance Model for Critical Conditions, Part 2: Southern Reaches**

<b>Reach</b>	<b>Inflows and Outflows to Reach: Best Available Data</b>				<b>Rationale for Assumption</b>
	<b>Flow, ft<sup>3</sup>/s*</b>	<b>Data Source for Flow</b>	<b>Conc., mg/L</b>	<b>Data Source for Concentration</b>	
<b>Type of Inflow or Outflow</b>	<b>Flow, ft<sup>3</sup>/s*</b>	<b>Conc., mg/L</b>	<b>Flow, ft<sup>3</sup>/s*</b>	<b>Conc., mg/L</b>	
<b>North Fork Conejo Creek, reach 12</b>					
Groundwater discharge and urban non-storm runoff	1.5 (part) average flow 1973-1983 = 15 cfs; Boyle Eng. 1987	140 1998-99: CCCS 2000	Average of 12 samples 1998-99: CCCS 2000	5	150 No available data to partition sources among groundwater, urban non-storm runoff, and any other sources. Assumed total flow in Reaches 12+13 = 10 cfs to be consistent with USGS data for critical conditions of 20 cfs at control point in reach 9, and with
<b>South Fork Conejo Creek, reach 13</b>					
Groundwater discharge and urban non-storm runoff	1.5 (part)	165 12 samples 1998-99 = 31 cfs; CCCS 2000	Average of 12 samples 1998-99: CCCS 2000	5	165 As above.
<b>Conejo Creek Hill Canyon, reach 10</b>					
Groundwater recharge	-2 Boyle Eng. 1987	Estimate for 1973-1983: Boyle Eng. 1987	-2 Boyle Eng. 1987	-2 (s)	
Hill Canyon Wastewater Treatment Facility (POTW)	15.2 reported discharges	Average of 1999 NPDES reported discharges	118 reported discharges	15.2 118	
<b>Control point: Inflow from reaches 12, 13</b>					
Agricultural withdrawals	-0.2 Boyle Eng. 1987	Average for 1973-1983: Boyle Eng. 1987	-0.2 (s)	-0.2 (s)	

\* Flow entering stream (inflow) is indicated by a positive number; outflow is indicated by a negative number  
(s) Stream conditions control this concentration: withdrawal water quality is dictated by ambient concentration at this point

## Calleguas Creek Chloride TMDL

## Draft Staff Technical Support Document

January 3, 2002

**Table A-1B, continued. Sources of Data for Linkage Analysis and Assumptions Used in Mass Balance Model for Critical Conditions, Part 2: Southern Reaches**

Reach	Inflows and Outflows to Reach: Best Available Data			Assumption for Linkage Model			
	Type of Inflow or Outflow	Flow, ft <sup>3</sup> /s*	Data Source for Flow	Conc., mg/L	Data Source for Concentration	Conc., mg/L	Rationale for Assumption
<b>Arroyo Santa Rosa, reach 11</b>							
Urban non-storm runoff	2.7	Total runoff for Santa Rosa (part) Valley (reaches 11, part of 9), estimate for 1973-1983: Boyle Eng. 1987	20	Concentration in urban non-storm runoff in Ballona Creek study by LADWP (Section 5A3)	2	20	Flow visible under non-storm conditions is low, slow, promotes algal growth; most assumed to originate with urban runoff. Groundwater discharge assumed 0 cfs.
Olsen Road (POTW)	0.31	Average of 1999 NPDES reported discharges	106	Average of 1999 NPDES reported discharges	0.31	106	(s) No agricultural withdrawals permitted in Reach 11, but withdrawals are observed.
Agricultural withdrawals	-4.2	Total irrigation withdrawals for (part) Santa Rosa Valley, avg. 1973-1983: Boyle Eng. 1987			-1.5		
Groundwater recharge	-1.8	Total recharge for Santa Rosa (part) Valley, estimate 1973-1983: Boyle Eng. 1987			-0.8	(s)	Part of instream flow enters groundwater in Reach 11. Groundwater recharge plus ag. withdrawals consume all flow; zero flow leaves Reach 11 under non-storm conditions.
<b>Conejo Creek main stem, reach 9--above USGS gauge</b>							
Urban non-storm runoff	2.7	As above. (part)	20	As above.	0.7	20	Remainder of 2.7 cfs estimated runoff not assumed to originate in Reach 11.
Agricultural withdrawals	-4.2	As above. (part)			-2.7	(s)	Remainder of 4.2 cfs estimated agricultural withdrawals not assumed to be taken in Reach 11.
Groundwater recharge	-1.8	As above. (part)			-0.8	(s)	Remainder of 4 cfs estimated groundwater recharge not assumed to occur in Reach 11.
<b>Control point: USGS gauge, Conejo Creek</b>	20	USGS data: non-storm conditions, 1979-1983. Inflow from reaches 10, 11, 12, 13.	160	H. Jones, 2000	20	123	Concentration calculated by the model using data and assumptions described in this table. Selected flow defines critical conditions.
<b>Conejo Creek main stem, reach 9--below USGS gauge</b>							
Groundwater discharge					2	150	Rising groundwater is documented downstream near Camrosa discharge; similar conditions exist upstream of the confluence.
Camarillo Wastewater Treatment Plant	3.3	Average of 1999 NPDES reported discharges	175	Average of 1999 NPDES reported discharges	3.3	175	
Agricultural withdrawals					-1	(s)	Withdrawals not authorized in Reach 9, but designated for ag. use: pumpds observed.
Subsurface inflow	1	Estimate for 1973-1983: Boyle Eng. 1987			1	(s)	

\* Flow entering stream (inflow) is indicated by a positive number; outflow is indicated by a negative number.

(s) Stream conditions control this concentration: withdrawal water quality is dictated by ambient concentration at this point.

**Table A-1C. Sources of Data for Linkage Analysis and Assumptions Used in Mass Balance Model for Critical Conditions, Part 3: Main Stem Calleguas Creek**

Reach	Assumption for Linkage Model						
	Type of Inflow or Outflow	Flow, ft <sup>3</sup> /s*	Inflows and Outflows to Reach: Best Available Data	Conc., mg/L			
Calleguas Creek main stem, reach 3			Data Source for Concentration	Flow, ft <sup>3</sup> /s*	Conc., mg/L	Rationale for Assumption	
Groundwater discharge (near Conejo Ck confluence)				2	250	Rising groundwater is documented in the vicinity of Camrosa WWRF percolation ponds, and is assumed to be present in similar quantities and similar chloride concentration elsewhere in the reach.	
Agricultural withdrawal		-0.5	(s) Agricultural withdrawal is not documented in Reach 3, but the reach is designated for irrigation beneficial use and illegal surface pumps have been observed.				
Agriculture discharge		2	250	Tile drains are known to contribute surface flow in this reach. Concentration is assumed equal to measured concentration in rising groundwater in this reach.			
Inflow from Reach 6		0	0	Reach 6 does not contribute any flow under standard low-flow conditions; all flow enters groundwater upstream of the confluence with Reach 3.			
Inflow from Reach 9		25.3	132	Calculated by the model using data and assumptions described in this table.			
Camrosa Wastewater Reclamation Facility (POTW)	2.3	Facility is assumed to operate at plant design flow of 1.5 MGD (= 2.3 cfs): Rincon, 1998	250	Average of 1997-98 effluent conditions: Rincon, 1998	0	0	Camrosa WWRF effluent is discharged to percolation ponds, not to stream channel.
Groundwater discharge (near Camrosa WWRF)		2.3	250	Camrosa WWRF effluent is discharged to percolation ponds in an area with a rising groundwater table, so is assumed to rapidly enter stream channel, in the same quantity and with the same chemical characteristics as facility effluent.			
<b>Control point: USGS gauge, Calleguas Creek Potrero Road</b>	30	USGS data: non-storm conditions, 1979-1983. Inflow from reaches 9, 10, 11, 12, 13.	30	155	Concentration calculated by the model using data and assumptions described in this table. Selected flow defines critical conditions.		

\* Flow entering stream (inflow) is indicated by a positive number; outflow is indicated by a negative number  
(s) Stream conditions control this concentration: withdrawal water quality is dictated by ambient concentration at this point.

**Table A-2. Rationale for Estimating Chloride Loads, Discharge Flows, and Ambient Concentration and Flow under Alternative Conditions Based on Typical Conditions.**

**Standard conditions**

Documented in Table A-1.

**Extreme low flow ("7Q10")**

*Concentration*

Assumed identical to standard conditions.

*Flow volume*

Assumes no discharges into the waterbody other than POTWs at standard conditions (groundwater discharge, urban non-storm runoff, agricultural drainage, etc. are zero).

Losses from stream channel due to groundwater recharge, agricultural withdrawals, etc. continue at volumes of typical conditions, except where limited by lack of available flow.

**Typical low flow (50th percentile of historical data)**

*Concentration*

Assumed identical to standard conditions.

*Flow volume*

In-stream flow calculated at three gauging stations as 50th percentile of historical flow, as described in Section 8.

Model mass balance used to compute in-stream flow at other locations.

Groundwater discharge, agricultural discharge, urban non-storm runoff reduced in proportion, using best professional judgment, so that modeled in-stream flow is consistent with modeled flow. POTW discharge flows remain at volume of standard conditions.

**Maximum non-storm conditions ("routine critical conditions")**

*Concentration*

Assumed identical to standard conditions.

*Flow volume*

POTW discharge flows at standard conditions.

Groundwater discharge, non-storm runoff, some agricultural discharges, and miscellaneous surface and sub-surface flows assumed at maximum flow; calculated using mass balance model to be consistent with statistically calculated maximum non-storm flow using historical data at three USGS gauges, as described in Appendix A.

**Table A-2, Continued. Rationale for Estimating Chloride Loads, Discharge Flows, and Ambient Concentration and Flow under Alternative Conditions Based on Typical Conditions.**

**Storm conditions**

*Concentration*

POTW, groundwater, all other discharges as in standard conditions.  
Urban runoff assumed 20 mg/L, average of Ballona Creek data for 1999.

*Flow volume*

All point source, subsurface, and miscellaneous discharges assumed at maximum non-storm conditions.  
Runoff estimated by reach using mass balance model, consistent with average historical storm flows measured at three gauging stations.

**Drought**

*Concentration*

POTW discharge concentration assumed to increase by 20% due to increase in imported water supply.  
In-stream concentration calculated using mass balance model.

*Flow volume*

POTW discharge flows remain at volume of standard conditions.  
Groundwater discharge and pumped groundwater flow reduced to zero.  
In-stream flow calculated using mass balance model; other discharges (urban non-storm runoff, etc.) reduced according to best professional judgment to be consistent with calculated in-stream flows.

**Immediate post-drought, high-volume conditions ("drought critical conditions")**

*Concentration*

POTW discharge concentration assumed to increase by 20% due to assumed continued high imported water supply.  
Groundwater discharge concentration assumed to increase 20% due to concentrating effect during drought.  
In-stream concentration calculated using mass balance model.

*Flow volume*

POTW discharge flows remain at volume of standard conditions.  
Groundwater discharge, pumped groundwater flow, non-storm runoff, etc. increased to same as "maximum non-storm flow" conditions, as worst-case scenario of post-drought flows.  
In-stream flow calculated using mass balance model, same as in "maximum non-storm flow" conditions.

Table A-3A. Linkage Analysis: Summary of Loads and In-Stream Conditions under Critical Flow, by Reach. Part 1: Northern Reaches

Reach	Extreme Low-Flow Conditions: 7Q10 (Effluent Only)						Typical Low-Flow Conditions: 50%ile Flow						Routine Critical Conditions: Maximum Non-Storm Flow						Long-Term Critical Conditions: Post-Drought, High Load, High Discharge						Storm Conditions: Non-Storm					
	Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day			Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day			Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day			Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day			Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day			Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day			Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day			Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day								
	Type of Inflow/Outflow	Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L lb/day					
<b>Tapo Canyon, Reach 8</b>																														
Groundwater discharge	0	--	--	0.5	160	427	1	160	854	0	--	--	1	192	1025	1	160	854												
Urban non-storm runoff	0	--	--	1	130	694	2	130	1,388	1	130	694	2	130	1,388	15	20	1,602												
<b>Arroyo Simi, Reach 7</b>																														
Groundwater discharge	0	--	--	1	160	854	1	160	854	0	--	--	1	192	1025	1	160	854												
Urban non-storm runoff	0	--	--	1	100	534	1	100	534	1	100	534	1	100	534	15	20	1,602												
<i>Conditions, USGS gauge Arroyo Simi</i>	<i>0</i>	<i>--</i>	<i>--</i>	<i>3.5</i>	<i>134</i>	<i>2,510</i>	<i>5</i>	<i>136</i>	<i>3,631</i>	<i>2</i>	<i>115</i>	<i>1,228</i>	<i>50</i>	<i>149</i>	<i>3,973</i>	<i>32</i>	<i>29</i>	<i>4,913</i>												
Groundwater discharge	0	--	--	1	150	801	2	150	1,602	0	--	--	2	180	1,922	2	150	1,602												
Pumped groundwater	0	--	--	1	150	801	3	150	2,403	0	--	--	3	180	2,884	3	150	2,403												
Simi Valley POTW	14.1	113	8,508	14.1	113	8,508	14.1	113	8,508	14.1	113	8,508	14.1	136	10,210	14.1	136	10,210	14	113	8,508									
<i>Conditions, outflow to Reach 6</i>	<i>14.1</i>	<i>113</i>	<i>8,508</i>	<i>19.6</i>	<i>121</i>	<i>12,620</i>	<i>24.1</i>	<i>125</i>	<i>16,144</i>	<i>16.1</i>	<i>133</i>	<i>11,438</i>	<i>24.1</i>	<i>148</i>	<i>18,989</i>	<i>51.1</i>	<i>64</i>	<i>17,426</i>												
<b>Arroyo Las Posas, Reach 6</b>																														
Agricultural withdrawals	-6	113	--	-6	121	--	-6	125	--	-6	133	--	-6	148	--	-6	148	--	-6	148	--	-6	148	--	-6	64	--			
Moorpark POTW **	3.1	118	1,953	3.1	118	1,953	3.1	118	1,953	3.1	142	2,344	3.1	142	2,344	3.1	118	1,953												
Groundwater recharge	-8.1	113	--	-13.6	121	--	-18	125	--	-10	133	--	-18	148	--	-18	148	--	-18	148	--	-18	148	--	-18	64	--			
<i>Conditions, mid-Reach 6</i>	<i>0</i>	<i>--</i>	<i>--</i>	<i>0</i>	<i>--</i>	<i>--</i>	<i>0</i>	<i>--</i>	<i>--</i>	<i>0</i>	<i>--</i>	<i>--</i>	<i>0</i>	<i>--</i>	<i>--</i>	<i>27</i>	<i>64</i>	<i>9,207</i>												

\* Withdrawals and outflows indicated by a negative number    \*\* Discharge to groundwater, not included in totals    \*\*\* Storm runoff simulated as inflow to same point as non-storm

**Table A-3B. Linkage Analysis: Summary of Loads and In-Stream Conditions under Critical Flow, by Reach. Part 2: Southern Reaches**

\*\*\*Storm runoff simulated as inflow to same point as non-storm runoff

Table A-3C. Linkage Analysis: Summary of Loads and In-Stream Conditions under Critical Flow, by Reach. Part 3: Calleguas Creek

Reach	Type of Inflow/Outflow	Extreme Low-Flow Conditions: 7Q10 (Effluent Only)				Typical Low-Flow Conditions: 50%ile Flow				Conditions: Maximum Non-Storm Flow				Routine Critical Conditions: Post-Drought, High Load, High Discharge				Long-Term Critical Conditions: Post-Drought, High Load, High Discharge				Storm Conditions: Non-Storm Average of Flows > Max.			
		Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L		Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L		Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L		Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L		Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L		Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L		Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L		Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L		Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L		Flow, Conc., Mass, ft <sup>3</sup> /s* mg/L					
		Flow, Conc., Mass, ft <sup>3</sup> /s*	lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s*	lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s*	lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s*	lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s*	lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s*	lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s*	lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s*	lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s*	lb/day	Flow, Conc., Mass, ft <sup>3</sup> /s*	lb/day				
<b>Calleguas Creek Main Stem, Reach 3</b>																						***			
Inflow from Reach 6	0	-	--	0	-	--	0	-	--	0	-	--	0	-	--	0	-	--	0	-	--	47			
Inflow from Reach 9	9.3	138	6,865	9.8	145	7,581	11.3	147	8,849	9.3	156	7,754	11.3	173	10,417	60	76	24,491	64	9207	64	9207			
Urban runoff	0	-	--	0	-	--	0	-	--	0	-	--	0	-	--	0	-	--	0	-	--	11			
Groundwater discharge	0	250	0	1	250	1,335	1.6	250	2,136	0	-	--	0	-	--	1.6	300	2,563	1.6	250	2,136	2,136			
Agricultural withdrawals	-1	-	--	-1	-	--	-1	-	--	-1	-	--	-1	-	--	-1	-	--	-1	-	--	-			
Agricultural discharge	0	-	--	0	250	0	2	250	2,670	2	250	2,670	2	300	3,204	2	300	3,204	2	250	2,670	2,670			
Camrosa POTW **	2.3	250	3,071	2.3	250	3,071	2.3	250	3,071	2.3	300	3,685	2.3	300	3,685	2.3	300	3,685	2.3	250	3,071	3,071			
Rising groundwater near Camrosa POTW	0	-	--	1	250	1,335	2.3	250	3,071	0	-	--	2.3	300	3,685	2.3	300	3,685	2.3	250	3,071	3,071			
<i>Conditions, USGS gauge Potrero Rd.</i>	<i>8.3</i>	<i>138</i>	<i>6,126</i>	<i>10.8</i>	<i>164</i>	<i>9,478</i>	<i>16.2</i>	<i>184</i>	<i>15,943</i>	<i>10.3</i>	<i>174</i>	<i>9,590</i>	<i>16.2</i>	<i>219</i>	<i>18,947</i>	<i>122.9</i>	<i>50</i>	<i>33,135</i>	<i>30.71</i>	<i>30.71</i>	<i>30.71</i>	<i>30.71</i>			

\* Withdrawals and outflows indicated by a negative number

\*\*Discharge to groundwater, not included in totals

\*\*\*Storm runoff simulated as inflow to same point as non-storm runoff

**Table A-4A. Proposed Changes in Chloride Loads after TMDL Implementation, Including Margin of Safety, Attaining Water Quality Objectives under Critical Conditions (Maximum Non-Storm Flow). Part 1: Northern Reaches.**

Reach	Current Loads, Critical Conditions				Changes Proposed by TMDL			
	Flow, ft <sup>3</sup> /s *	Conc., mg/L	Mass, lb/day	Projected Flow, ft <sup>3</sup> /s*	Reduced Mass, lb/day	Percent Reduction	Target Conc., mg/L	LA / WLA, lb/day
<b>Discharge</b>								
<b>Tapo Canyon, Reach 8</b>								
Groundwater discharge	1	160	850	1	0	0	160	850
Urban non-storm runoff	2	130	1,400	2	0	0	130	1,400
<b>Arroyo Simi, Reach 7</b>								
Groundwater discharge, headwaters	1	160	850	1	0	0	160	850
Urban non-storm runoff	1	100	530	1	0	0	100	530
<b>Conditions, USGS gauge Arroyo Simi</b>	<b>5</b>	<b>136</b>	<b>3,600</b>	<b>5</b>			<b>136</b>	<b>3,600</b>
Pumped groundwater	3	150	2,400	2.8	1,200	50%	83	1,200
Simi Valley POTW	14.1	113	8,500	13.5	2,500	29%	83	6,000
Groundwater discharge, near Simi Valley	2	150	1,600	2	0	0	150	1,600
<b>Conditions, outflow to Reach 6</b>	<b>24.1</b>	<b>125</b>	<b>16,100</b>	<b>23.2</b>			<b>100</b>	<b>12,900</b>
<b>Arroyo Las Posas, Reach 6</b>								
Agricultural withdrawals	-6	125	--	-6			100	--
Moorpark POTW **	3.1	118	2,000	3.0	400	20%	100	1,600
Groundwater recharge	-18	125	--	-18			100	--
<b>Conditions, mid-Reach 6</b>	<b>0</b>	<b>--</b>	<b>--</b>	<b>0</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>

\* Withdrawals and outflows indicated by a negative number

\*\* Discharge to groundwater: not directly included in flow totals or mass balance calculations

**Table A-4B. Proposed Changes in Chloride Loads after TMDL Implementation, Including Margin of Safety, Attaining Water Quality Objectives under Critical Conditions (Maximum Non-Storm Flow). Part 2: Southern Reaches.**

Reach	Current Loads, Critical Conditions			Changes Proposed by TMDL				
	Flow, ft <sup>3</sup> /s*	Conc. mg/L	Mass, lb/day	Projected Flow, ft <sup>3</sup> /s*	Reduced Mass, lb/day	Percent Reduction in Mass	Target Conc., mg/L	LA / WLA, lb/day
<b>Conejo Creek South Fork, Reach 13</b>								
Groundwater discharge	1.5	160	1,300	1.5	0	0	160	1,300
Pumped groundwater	0.5	160	430	0.5	70	16%	136	360
Urban non-storm runoff	3	160	2,600	3	0	0	160	2,600
<b>Conejo Creek North Fork, Reach 12</b>								
Groundwater discharge	3	150	2,400	3	0	0	150	2400
Urban non-storm runoff	2	150	1,600	2	0	0	150	1,600
<b>Arroyo Santa Rosa, Reach 11</b>								
Groundwater recharge	-1.3	--	--	-1.3	--	--	--	--
Agricultural withdrawals	-2	--	--	-2	--	--	--	--
Groundwater discharge	3	130	2,100	3	0	0	130	2,100
Urban non-storm runoff	1.5	100	800	1.5	0	0	100	800
<b>Conejo Creek Hill Canyon, Reach 10</b>								
Groundwater recharge	-6	--	--	-6	--	--	--	--
Hill Canyon POTW	15.2	118	9,600	15.2	-500	-5%	125	10,100
Agricultural withdrawals	-0.4	--	--	-0.4	--	--	--	--
<i>Conditions, USGS gauge Conejo Ck.</i>	<i>20.0</i>	<i>131</i>	<i>13,900</i>	<i>20.0</i>			<i>136</i>	<i>14,500</i>
<b>Conejo Creek main stem, Reach 9B</b>								
Groundwater discharge	2	130	1,400	2	0	0	130	1,400
Urban non-storm runoff	0.8	100	430	0.8	0	0	100	430
Agricultural withdrawals	-1	--	--	-1	--	--	--	--
Subsurface inflow	1	131	700	1	0	0	136	720
<i>Conditions at proposed diversion</i>	<i>22.8</i>	<i>130</i>	<i>15,800</i>	<i>22.8</i>			<i>134</i>	<i>16,300</i>
<b>Conejo Creek main stem, below diversion, Reach 9A</b>								
Diversions	-16.8	--	--	-16.8	--	--	--	--
Groundwater discharge	2	150	1,600	2	0	0	150	1,600
Camarillo POTW	3.3	175	3,100	3.2	800	26%	133	2,300
<i>Conditions, Conejo/Callequias confluence</i>	<i>11.3</i>	<i>146</i>	<i>8,800</i>	<i>11.2</i>			<i>136</i>	<i>8,200</i>

\* Withdrawals and outflows indicated by a negative number      \*\* Discharge to groundwater: not directly included in flow totals or mass balance calculations

**Table A-4C. Proposed Changes in Chloride Loads after TMDL Implementation, Including Margin of Safety, Attaining Water Quality Objectives under Critical Conditions (Maximum Non-Storm Flow). Part 3: Calleguas Creek Main Stem.**

<u>Reach</u>	<u>Current Loads, Critical Conditions</u>				<u>Changes Proposed by TMDL</u>			
	<u>Flow, ft<sup>3</sup>/s *</u>	<u>Conc. mg/L</u>	<u>Mass, lb/day</u>	<u>Projected Flow, ft<sup>3</sup>/s*</u>	<u>Reduced Mass, lb/day</u>	<u>Percent Reduction</u>	<u>Target Conc., mg/L</u>	<u>LA/ WLA, lb/day</u>
<b>Calleguas Creek Main Stem, Reach 3</b>								
Inflow from Reach 6	0	--	--	0	0	--	--	--
Inflow from Reach 9	11.3	146	8,800	11.3	11.3	0	136	8,200
Groundwater discharge near Conejo confl.	1.6	250	2,100	1.5	1,000	48%	136	1,100
Agricultural withdrawals	-1	--	--	-1.0	--	--	--	--
Agricultural discharge	2	250	2,700	1.8	1,400	52%	136	1,300
Camrosa POTW **	2.3	250	3,100	2.1	1,600	52%	136	1,500
Groundwater discharge near Camrosa POTW	2.3	250	3,100	2.1	1,600	52%	136	1,500
<b>Conditions, USGS gauge Potrero Rd.</b>	<b>16.2</b>	<b>184</b>	<b>15,900</b>	<b>15.7</b>	<b>15,700</b>	<b>136</b>	<b>11,800</b>	

\* Withdrawals and outflows indicated by a negative number

\*\* Discharge to groundwater: not directly included in flow totals or mass balance calculations

**Table A-5A. Proposed Changes in Chloride Loads after TMDL Implementation, Including Margin of Safety, Attaining Water Quality Objectives under Drought and Post-Drought Conditions. Part 1: Northern Reaches.**

Reach	Current Loads, Post-Drought Conditions			Changes Proposed by TMDL		
	Flow, ft <sup>3</sup> /s *	Cone., mg/L	Mass, lb/day	Projected Flow, ft <sup>3</sup> /s *	Reduced Mass, lb/day	Target Conc., mg/L
<b>Discharge</b>						
<b>Tapo Canyon, Reach 8</b>						
Groundwater discharge	1	192	1,000	1	0	0
Urban non-storm runoff	2	130	1,400	2	0	0
<b>Arroyo Simi, Reach 7</b>						
Groundwater discharge, headwaters	1	192	1,000	1	0	0
Urban non-storm runoff	1	100	530	1	0	0
<b>[Conditions, USGS gauge Arroyo Simi]</b>	<b>5</b>	<b>149</b>	<b>4,000</b>	<b>5</b>		
Pumped groundwater	3	180	2,900	2.7	1,800	62%
Simi Valley POTW	14.1	136	10,200	13.1	5,000	49%
Groundwater discharge, near Simi Valley	2	180	1,900	2	0	0
<b>[Conditions, outflow to Reach 6]</b>	<b>24.1</b>	<b>148</b>	<b>19,000</b>	<b>22.8</b>		
<b>Arroyo Las Posas, Reach 6</b>						
Agricultural withdrawals	-6	148	--	-6		100
Moorpark POTW	3.1	142	2,300	3.0	700	30%
Groundwater recharge	-18	148	--	-17		100
<b>[Conditions, mid-Reach 6]</b>	<b>0</b>	<b>--</b>	<b>--</b>	<b>0</b>		

\* Withdrawals and outflows indicated by a negative number      \*\*Discharge to groundwater: not directly included in flow totals or mass balance calculations

**Table A-5B. Proposed Changes in Chloride Loads after TMDL Implementation, Including Margin of Safety, Attaining Water Quality Objectives under Drought and Post-Drought Conditions. Part 2: Southern Reaches.**

Reach	Current Loads, Post-Drought Conditions				Changes Proposed by TMDL			
	Flow, ft <sup>3</sup> /s *	Conc., mg/L	Mass, lb/day	Projected Flow, ft <sup>3</sup> /s *	Reduced Mass, lb/day	Percent Reduction in Mass	Target Conc., mg/L	LA / WLA, lb/day
<b>Discharge</b>								
<b>Conejo Creek South Fork, Reach 13</b>	1.5	192	1,500	1.5	0	0	192	1,500
Groundwater discharge	0.5	192	500	0.5	170	34%	124	330
Pumped groundwater	3	160	2,600	3	0	0	160	2,600
<b>Conejo Creek North Fork, Reach 12</b>	3	180	2,900	3	0	0	180	2,880
Groundwater discharge	2	150	1,600	2	0	0	150	1,600
<b>Arroyo Santa Rosa, Reach 11</b>	-1.3	--	--	-1.3	--	--	--	--
Groundwater recharge	-2	--	--	-2	--	--	--	--
Agricultural withdrawals	3	156	2,500	3	0	0	156	2,500
Groundwater discharge	1.5	100	800	1.5	0	0	100	800
<b>Conejo Creek Hill Canyon, Reach 10</b>	-6	--	--	-6	--	--	--	--
Groundwater recharge	15.2	142	11,500	14.6	1,800	16%	124	9,700
Hill Canyon POTW	-0.4	--	--	-0.4	--	--	--	--
<i>Conditions, USGS gauge Conejo Ck.</i>	<i>20.0</i>	<i>151</i>	<i>16,100</i>	<i>19.4</i>			<i>136</i>	<i>14,100</i>
<b>Conejo Creek main stem, Reach 9B</b>								
Groundwater discharge	2	156	1,700	2	0	0	156	1,700
Urban non-storm runoff	0.8	100	430	0.8	0	0	100	430
Agricultural withdrawals	-1	--	--	-1	--	--	--	--
Subsurface inflow	1	151	810	1	80	10%	136	730
<i>Conditions at proposed diversion</i>	<i>22.8</i>	<i>150</i>	<i>18,200</i>	<i>22.2</i>			<i>136</i>	<i>16,200</i>
<b>Conejo Creek main stem, below diversion, Reach 9A</b>								
Diversion ***	-16.8	--	--	-16	--	--	--	--
Groundwater discharge	2	180	1,900	1.9	500	26%	136	1,400
Camarillo POTW	3.3	210	3,700	3.1	1,500	41%	136	2,200
<i>Conditions, Conejo/Callequias confluence</i>	<i>11.3</i>	<i>173</i>	<i>10,400</i>	<i>11</i>			<i>136</i>	<i>8,000</i>

\* Withdrawals and outflows indicated by a negative number

\*\* Discharge to groundwater: not directly included in flow totals or mass balance calculations

**Table A-5C. Proposed Changes in Chloride Loads after TMDL Implementation, Including Margin of Safety, Attaining Water Quality Objectives under Drought and Post-Drought Conditions. Part 3: Calleguas Creek Main Stem.**

Reach	Current Loads, Post-Drought Conditions				Changes Proposed by TMDL			
	Flow, ft <sup>3</sup> /s *	Conc., mg/L	Mass, lb/day	Projected Flow, ft <sup>3</sup> /s *	Reduced Mass, lb/day	Percent Reduction in Mass	Target Conc., mg/L	LA / WLA, lb/day
<b>Calleguas Creek Main Stem, Reach 3</b>								
Inflow from Reach 6	0	--	--	0	--	--	--	--
Inflow from Reach 9	11.3	173	10,400	11.0	11.0	0%	136	8,000
Groundwater discharge near Conejo confl.	1.6	300	2,600	1.4	1,600	62%	136	1,000
Agricultural withdrawals	-1	--	--	-1	--	--	--	--
Agricultural discharge	2	300	3,200	1.8	1,900	59%	136	1,300
Camrosa POTW	2.3	300	3,700	2.1	2,200	59%	136	1,500
Groundwater discharge near Camrosa POTW	2.3	300	3,700	2.1	2,200	59%	136	1,500
<b>Conditions, USGS gauge Potrero Rd.</b>	<b>16.2</b>	<b>219</b>	<b>18,900</b>	<b>15.3</b>	<b>136</b>	<b>11,100</b>		

\* Withdrawals and outflows indicated by a negative number

\*\* Discharge to groundwater: not directly included in flow totals or mass balance calculations

**Figure A-1. Identification of maximum non-storm flow for three locations using cumulative frequency distribution and normal/log-normal distribution analysis.**

